



# Institute for Materials Science

UNCLASSIFIED

## 2016 IMS Summer School: Los Alamos Science Capabilities

Giday WoldeGabriel, PhD  
LANL Fellow



### Complex Earth Processes, Environmental Settings, and the Human Origins Records

Thursday, June 23, 2016

2:30 PM

MSL Auditorium (TA-03 - Bldg 1698 - Room A103)

The IMS Summer School focuses on Science Capabilities at Los Alamos National Laboratory and is designed to expose our visitors to the broad range of great science performed at the Lab. Through the course of **seven talks** and **four site visits**, students will have a unique opportunity to learn about LANL directly from our top scientists and participate in facility tours.

**Abstract:** Plate Tectonic processes moved and pinned the African continent within equatorial latitudes for the past 150 million years, creating favorable climatic and environmental conditions for animals and plants to continuously proliferate. The African Plate became ridge-bounded with negligible plate motion, which triggered mantle plume, regional uplift or doming, widespread volcanism, and breakup along the northeastern part of the continent. The continental break up led to the formation of the Red Sea and the Gulf of Aden oceanic rift basins and the continental eastern Africa Rift System (EARS), starting at about 30 million years ago. Today, the EARS is the most active continental rift in the world.

Results from more than three decades of geological, paleobiological, and paleoenvironmental investigations in the Afar Rift of northeastern Ethiopia indicate that anatomically modern human beings and their ancestors originated in the African continent and inhabited the EARS for millions of years before they dispersed to the rest of the world. Despite hostile environmental settings and conditions related to intense and voluminous volcanic eruptions, earthquakes, and ground deformation and subsidence during the formation of the EARS in the past 20 million years, favorable ecological niches allowed the proliferation and preservation of rich fauna and flora, including hominid ancestors within the anarchic environment of the rift basins. The talk will highlight the geological processes, environmental conditions, the paleobiological records, and the emergence of anatomically modern humans in eastern Africa.

**Bio:** Dr. Giday WoldeGabriel is a native of Ethiopia, who earned his PhD in Geology from Case Western Reserve University in Cleveland, Ohio in 1987. Giday is a geologist in the Earth and Environmental sciences Division and came to LANL as a Directors postdoctoral fellow in 1987. He has worked on many projects related to geothermal energy, environmental restoration, site characterizations for nuclear waste disposal, oil shale resources evaluation, natural phenomena hazards assessments, etc. He also actively collaborates with colleagues at the University of California, Berkeley and the University of Tokyo on the geology, tectonics, and human origins studies in the Ethiopian Rift System. Giday has authored and coauthored more than 75 peer-reviewed papers, including more than 15 papers in Science and Nature journals. He is a recipient of the 2001 LANL Fellows Prize and was selected Laboratory Fellow in 2010. Giday organized two international workshops on 'Transboundary Water Issues in the Nile River Basin and on 'Volcanic Ash Applications to Geological and Environmental Studies'. He is Editorial Board Member of Quaternary International, the Journal of the International Union for Quaternary Research.

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